Cassini Science at Jupiter

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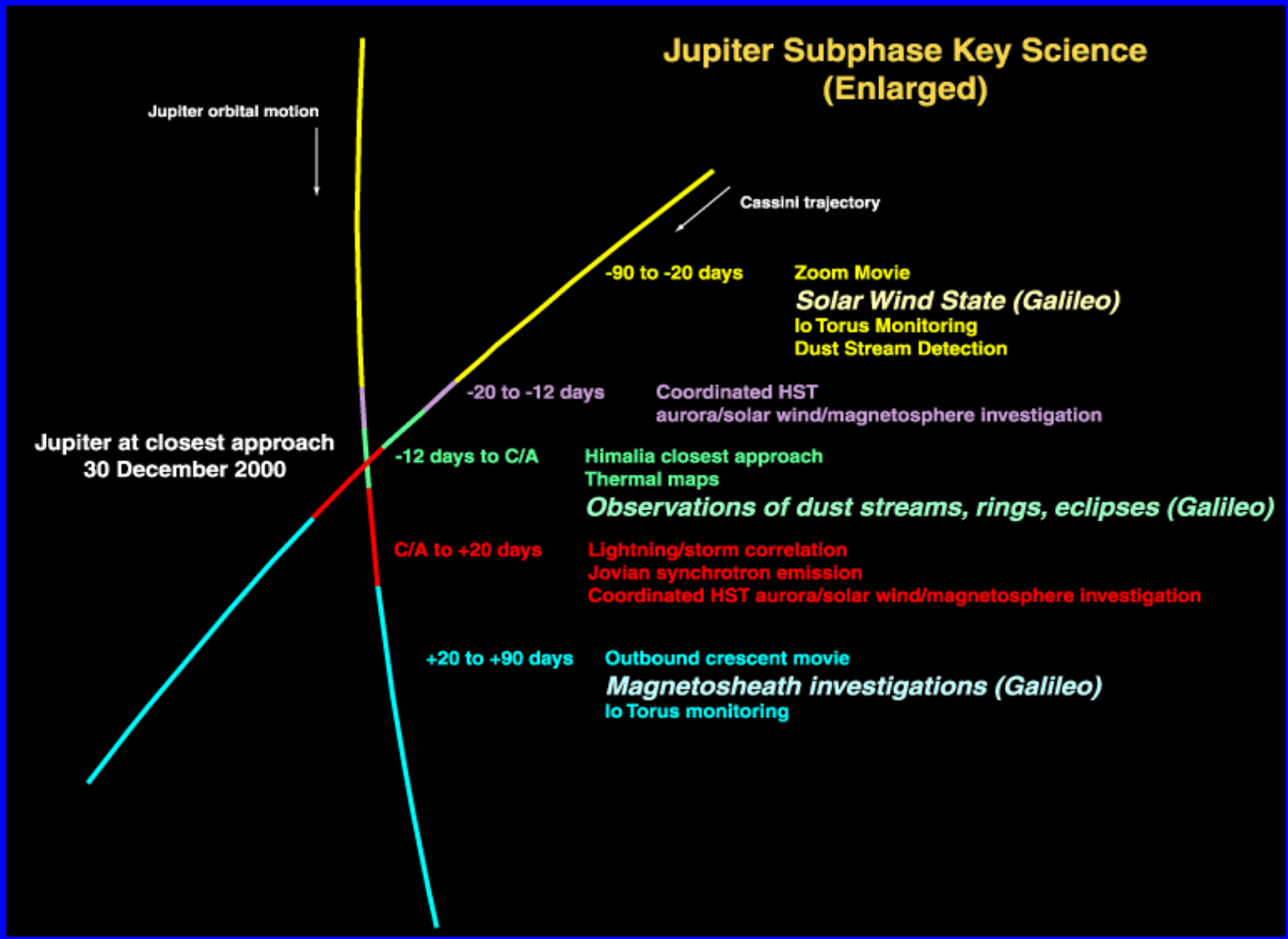
Overview

- Joint Cassini and Galileo observations
  - First time 2 separate spacecraft are operating at Jupiter
- Cassini Jupiter closest approach: Dec. 30th
- To date more than 9,000 images have been returned to Earth (24,000 total expected)


Jupiter Subphase Key Science
(Enlarged)
Jupiter orbital motion
Cassini trajectory
-90 to -20 days
Zoom Movie
Solar Wind State (Galileo)
Io Torus Monitoring
Dust Stream Detection
-20 to -12 days
Coordinated HST
aurora/solar wind/magnetosphere investigation
Jupiter at closest approach
30 December 2000
-12 days to C/A
Himalia closest approach
Thermal maps
Observations of dust streams, rings, eclipses (Galileo)
C/A to +20 days
Lightning/storm correlation
Jovian synchrotron emission
Coordinated HST aurora/solar wind/magnetosphere investigation
+20 to +90 days
Outbound crescent movie
Magnetosheath investigations (Galileo)
Io Torus monitoring

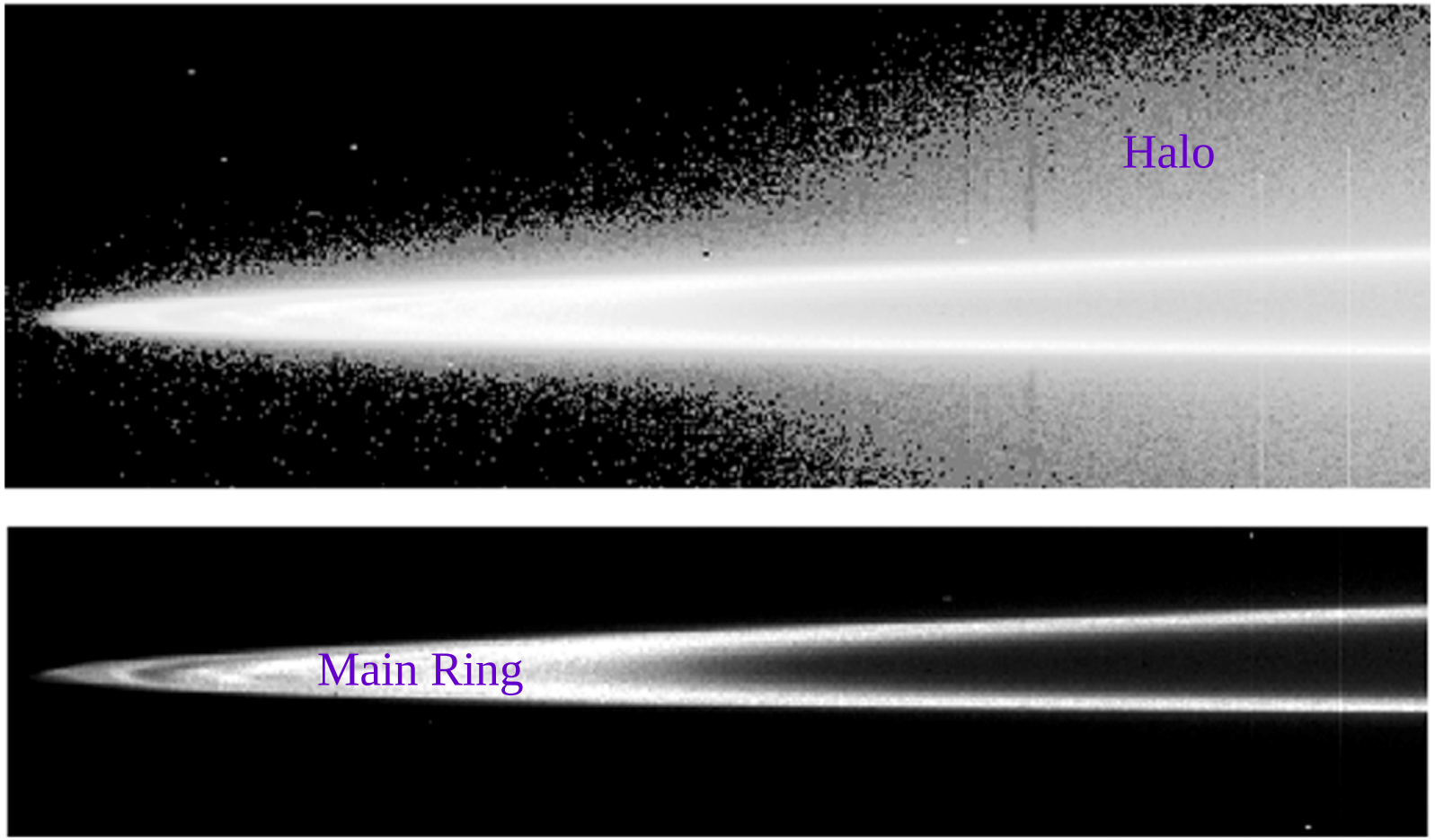
Ring Science Overview

- Investigate interaction of Jupiterís small satellites with its ring
- Determine 3 dimensional structure
- Determine particle size distribution
- Detect any temporal variability

Ring Observations

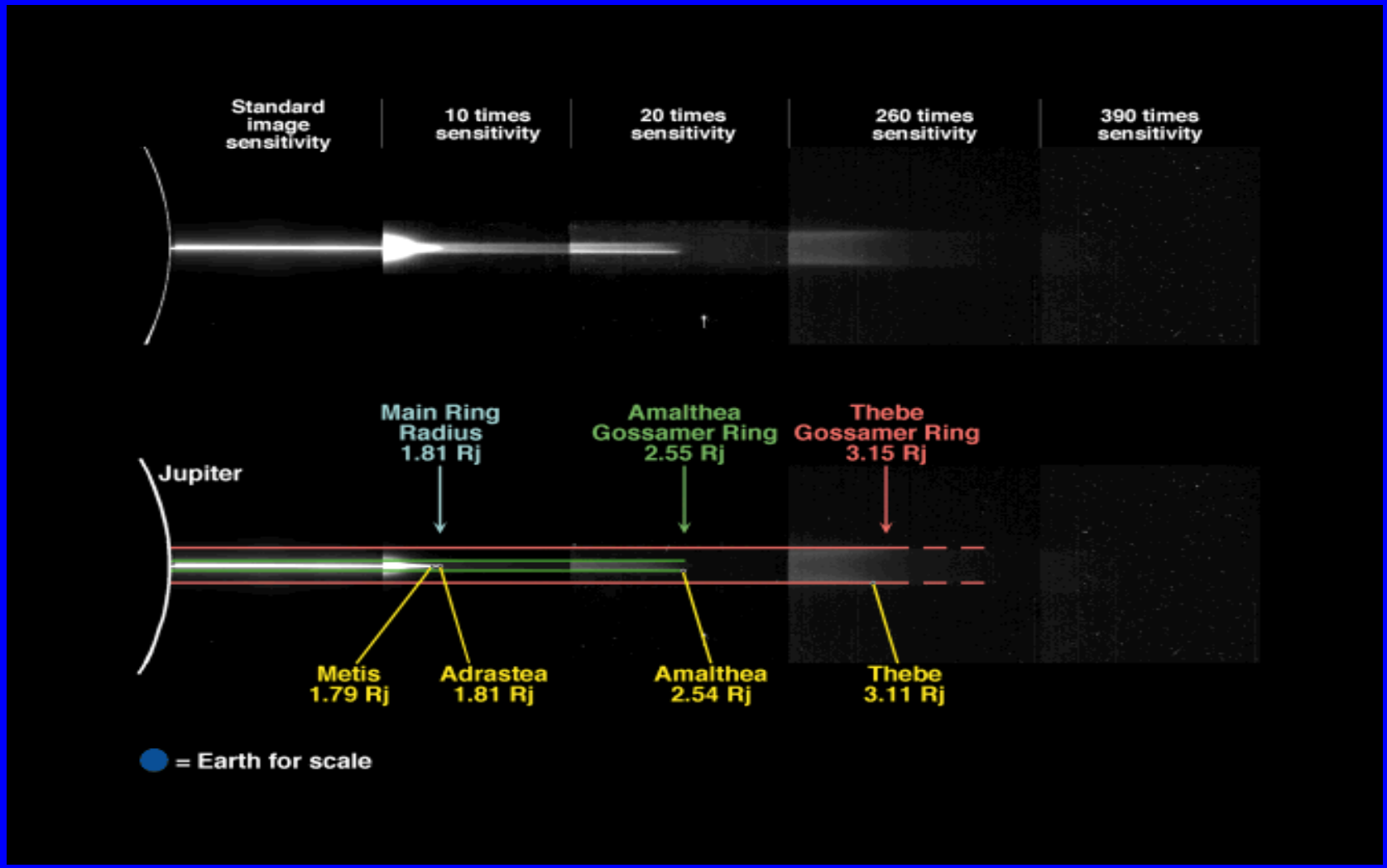
- Two ring movies
  - ñ Dec. 12 & Jan. 15 (almost 40 hours long)
- Phase Angle coverage (Dec. 19 - Jan. 15)
  - ñ 7 Observations: 11, 24, 45, 60, 75, 94 & 120
- Joint experiments with Galileo
  - ñ Ring Plane crossing

Jupiterís Main Ring and Halo

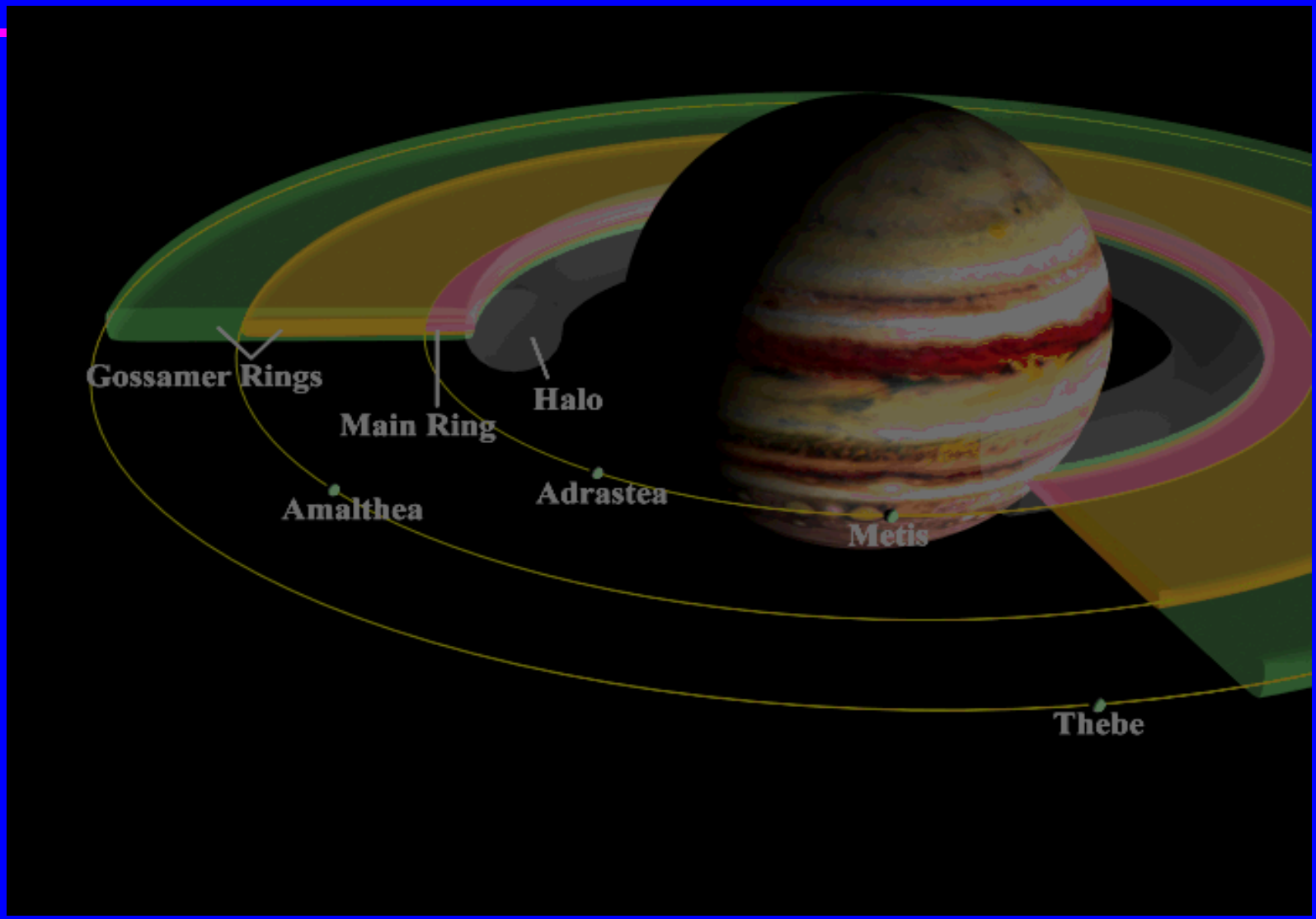


Jupiterís Gossamer Ring

Jupiter Rings Edge-On



Jupiter Rings and Inner Satellites

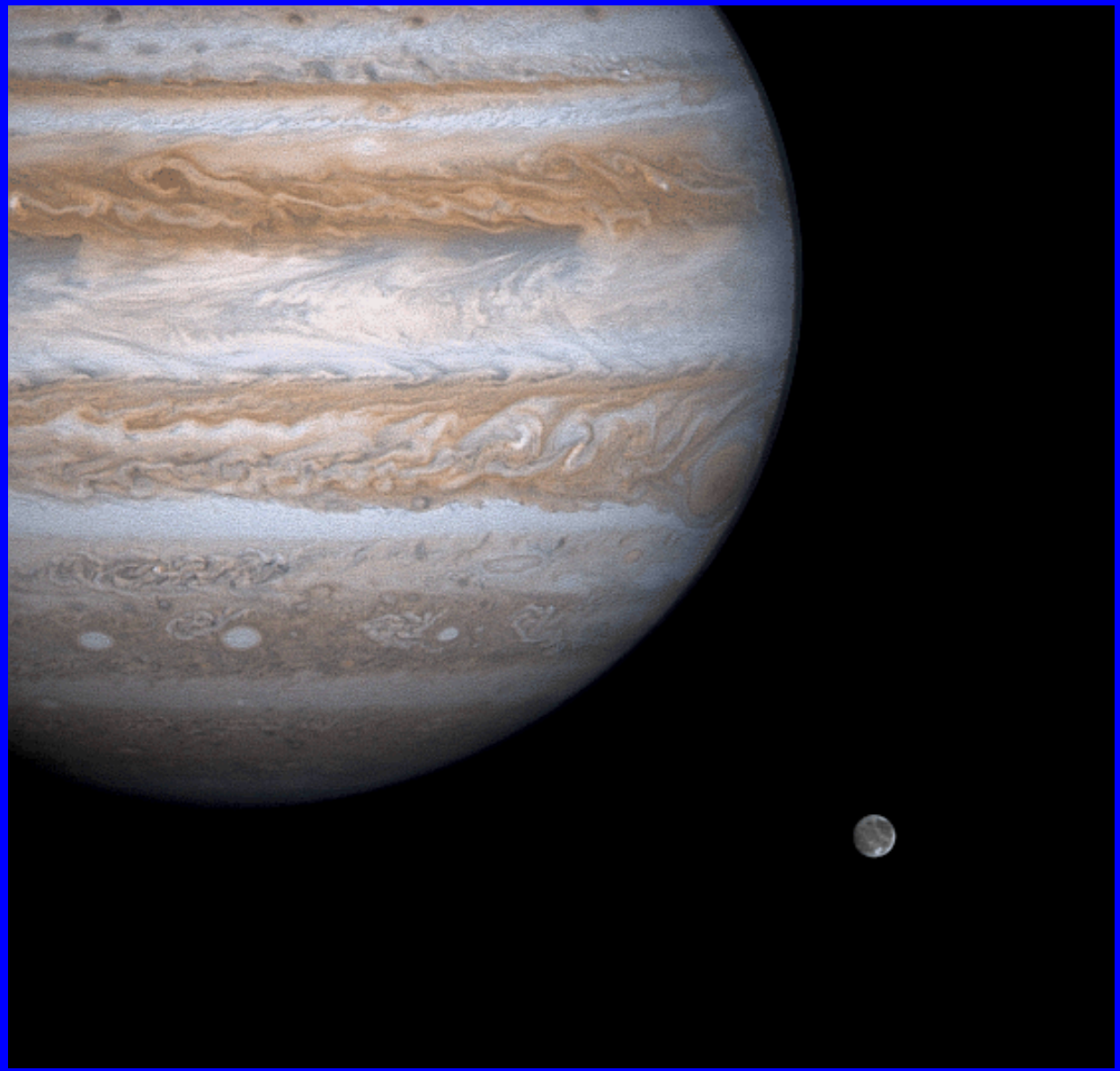


Atmospheric Science Objectives

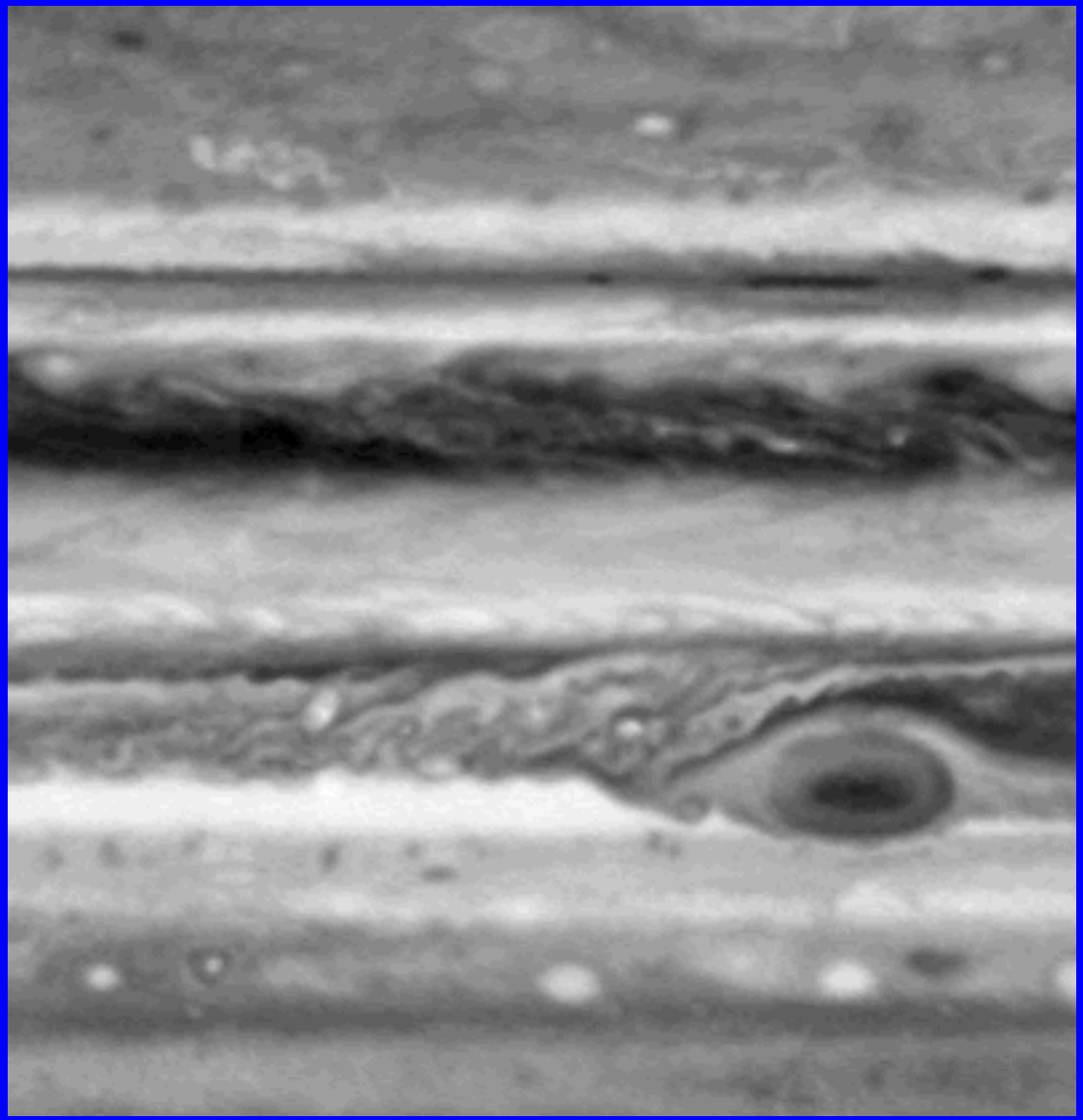
- Study atmospheric dynamics and weather
- Measure wind velocities, monitor storms
- Search for new atmospheric compounds
- Establish link between darkside lightning sites and dayside storm features
- Monitor variability of polar aurora

Atmospheric Observations

- Zoom Movies: (-90d to -20d, +20d to +90d)
  - ñ Image every 60 deg in longitude in 10-hour blocks
  - ñ Joint Infrared and Ultraviolet observations
- 8 North/South Maps (Dec 22 to Jan 11)
  - ñ 15-20-hour maps
- High resolution feature studies (Dec. 24 - Jan. 7)
- Two joint observing periods with Hubble Space Telescope (Dec. 10-20, Jan. 9-19)
  - ñ 8 sets of 24-hour observations



Jupiterís Great Red Spot ìeyesî Ganymede. Pictures for this color composite were taken Nov. 18, 2000. Smallest features are about 240 km (150 mi) across.



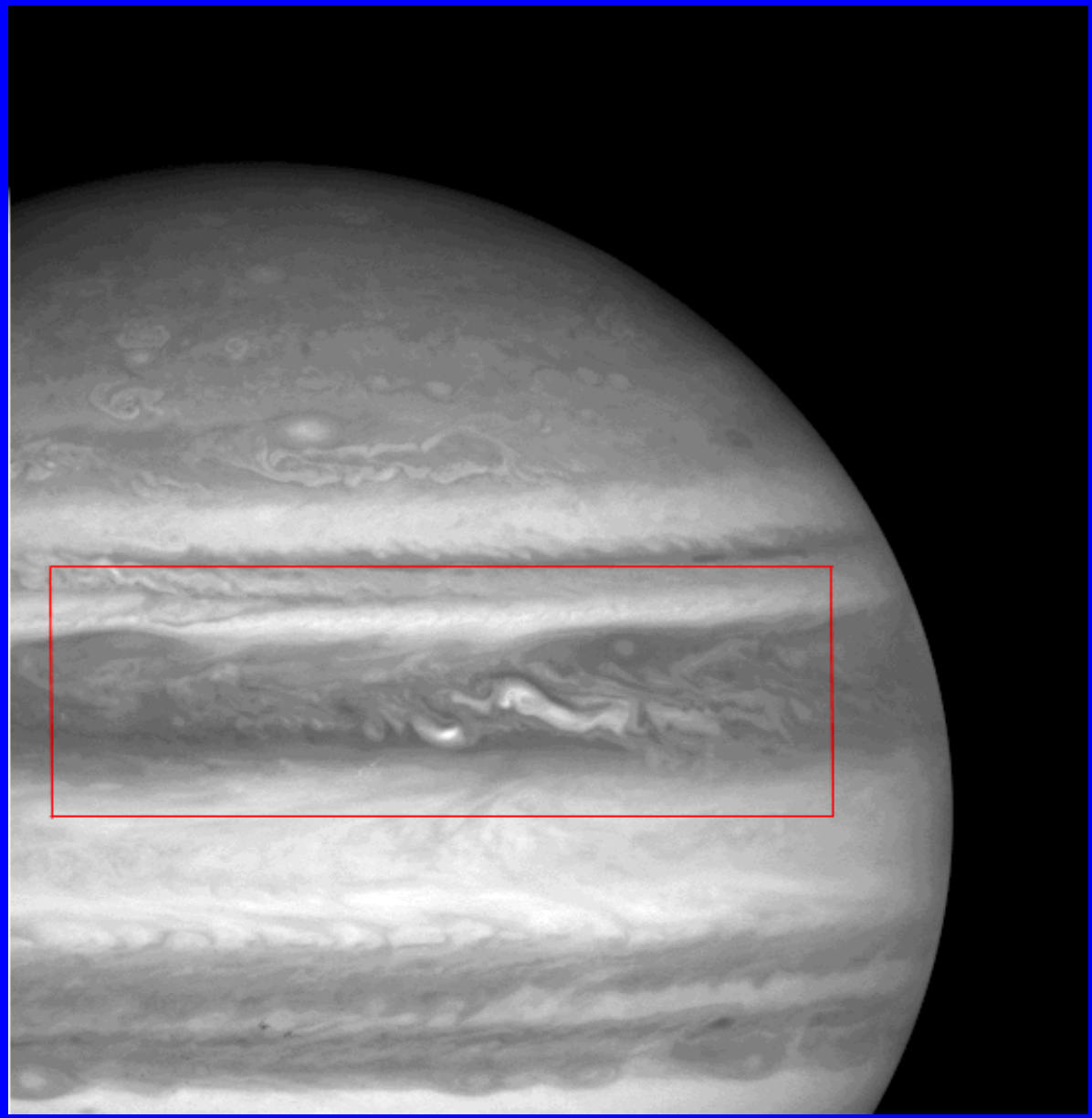
Great Red Spot image taken in blue filter. The smallest features are about 500 km (300 miles) across. Three earths would sit side-by-side in the GRS.

Red Spot Movie

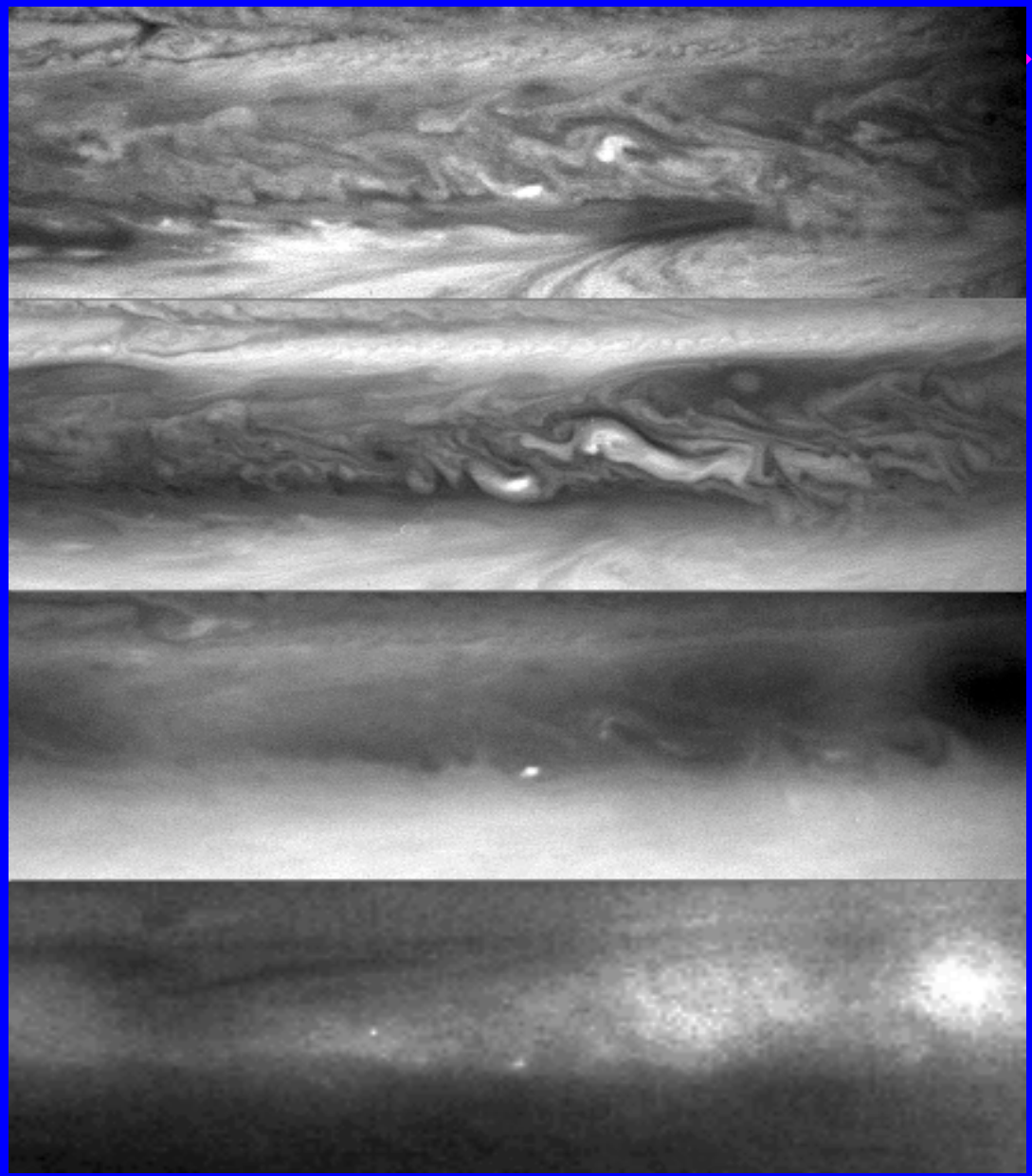
QuickTime™ and a
GIF decompressor
are needed to see this picture.

You may download or view the movie at the website below

http://www.jpl.nasa.gov/jupiterflyby/gallery/gl_pages/pia02829.html



Red box indicates a segment of Jupiter's North Equatorial Belt which contains a bright turbulent region (storm). Image was taken Nov. 27.



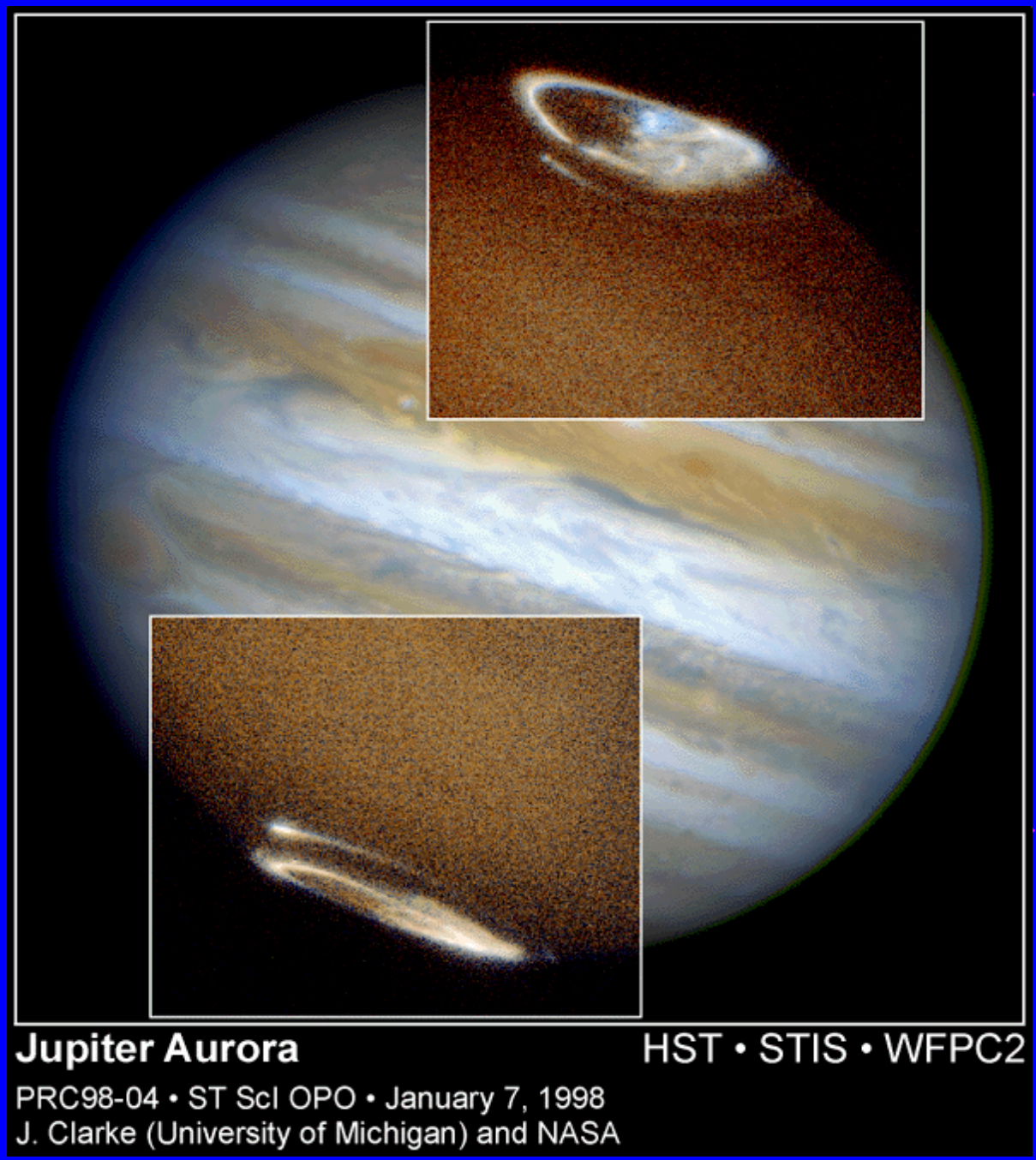
Bright storm is seem at many levels in atmosphere. Images (from top down) were taken in near-ir, blue, methane, and uv wavelengths, corresponding to deep in the atmosphere to much higher in the atmosphere.

Zonal Jets Movie

You may download or view the movie at the website below

QuickTime™ and a
GIF decompressor
are needed to see this picture.

http://www.jpl.nasa.gov/jupiterflyby/gallery/gl_pages/pia02831.html

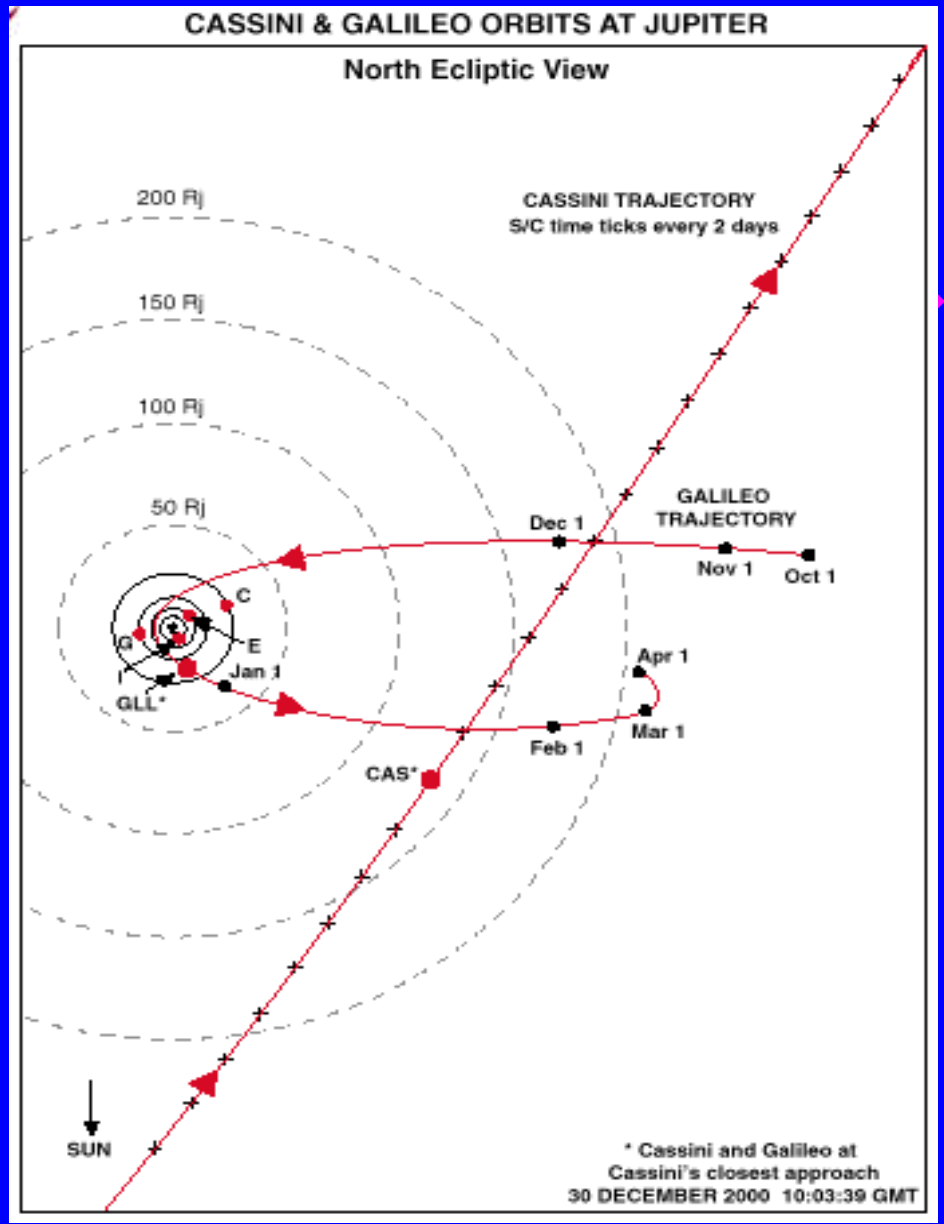


Jupiter's auroras (oval-shaped objects at poles) in ultraviolet inset images from Hubble Space Telescope. Both auroras show vapor trails of light left by Io.

Cassini will make joint observations with HST.

Web Pages for more Information

- Jupiter Web pages:
  - ñ http://www.jpl.nasa.gov/jupiterflyby/
  - ñ http://www.jpl.nasa.gov/cassini/flybyscience/
- Galileo ring images
  - ñ http://galileo.jpl.nasa.gov/images/rings.html
- Jupiter Images
  - ñ http://www.jpl.nasa.gov/pictures/jupiter/
  - ñ http://ciclops.lpl.arizona.edu/



Joint Cassini-Galileo Observing

During the Cassini flyby in December Cassini will be measuring the solar wind while Galileo makes *in situ* measurements of the magnetic field response to the solar wind. Many joint Cassini-Galileo science measurements are being made.